Cyber-Physical Social Systems (CPS2)

Master of Science

—————

www.mines-stetienne.fr

INSPIRING
INNOVATION
SINCE 1816

A Master of Science (National Masters' Degree)
Accredited by the French Ministry of Higher Education and Research
*at the **École Nationale Supérieure des Mines de Saint-Étienne**, France*
*Cohabilited with **University Jean Monnet / University of Lyon***

🇬🇧 **Taught in English**

A new opportunity for international students

- Taught in English
- A one year program
- Provide the diploma of Master of science
- A key step for PhD studies

CPS² trains high level computer scientists to understand and design cyber-physical and social systems to support the increasing interconnection of physical, social and digital dimensions that transforms our societies. Industry 4.0, smart cities, intelligent transport systems are some examples of such CPS Systems.

Course structure

Each course aims at presenting current models and technologies used in industry as well as the ones currently developed and discussed in the scientific domain.

Trust & Privacy (3 ECTS - 15h)
Access control models and technologies. Trust management and negotiation. Privacy management models and approaches

Web Services (3 ECTS - 25h)
Design and development of Web services

Cloud Computing (3 ECTS - 20h)
Technical & economical challenges of cloud computing architectures. Models and current technologies to design and develop Cloud services, Cloud services hosting platform and Cloud clients.

Distributed and Mobile Computing (3 ECTS - 25h)
Models and technologies for development of Client-server architectures, J2E application, mobile applications (Android, IOS)

Internet of Things (5ECTS – 40h)
Concepts, models and technologies to develop Intelligent Ambient systems (e.g. machine-to-machine, web of things, pervasive computing). A particular focus is done on some technologies and platforms supporting these approaches: Arduino, Android, Zigby, etc.

Semantic Web (5ECTS – 40h)
Techniques to publish and deploy structured data on the Web. Tools and technologies for consuming and managing Web data, as well as knowledge representation and reasoning on the Web.

Multiagent Coordination (4ECTS – 20h)
Coordination mechanisms and models (e.g. DCOP, Auctions, Orchestration) to be used in the design and development of decentralized and distributed systems composed of autonomous agents

CPS2 Project (4ECTS – 40h)
For a selected application domain, major issues in the development of Cyber-physical social applications (e.g. transport, smart city, energy, health)

Internships Opportunities

- Design a generic solution based on an organizational Multiagent model for the transition of autonomous vehicles at an urban junction.
- Distributed resource allocation algorithms for limited-communication devices.
- Handling Custom Datatypes in Semantic Web standards for Question Answering

PhD Opportunities

- Spontaneous coordination of connected objects in the Internet of Things
- Weaving a Social Web of Things: Enabling Autonomous and Flexible Interaction in the Internet of Things
- Multi-Agent Based Context Management Middleware in Support of Ambient Intelligence Applications

Job Opportunities

- Researchers for the development of CPS systems.
- Functional consultants
- Project managers for transport, energy, health applications
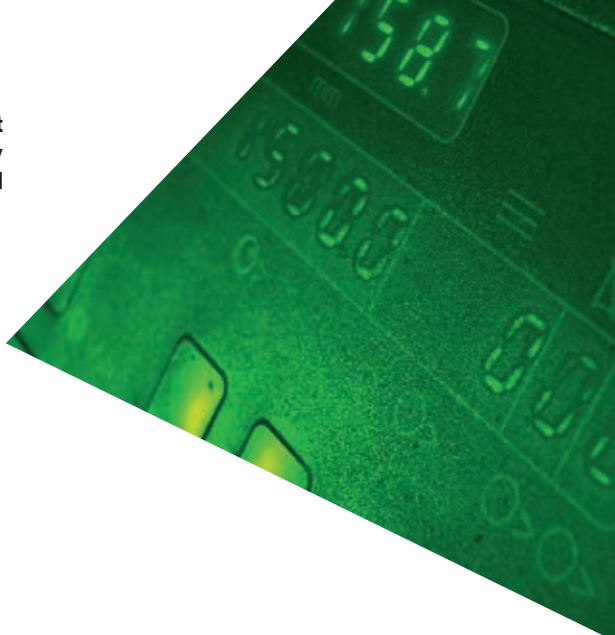
Requirements
for applicants

- Prior successful completion of a first year of a Master's Degree in theoretical and / or computer science, or equivalent diploma (at the home university or Ecole des Mines) /or 240 ECTS validated
- A good command of English is mandatory.

Contact:
G. PICARD
gauthier.picard@emse.fr

With the collaboration of the CI
research team Connected Intelligence

The research team Connected Intelligence of the Laboratory Hubert Curien UMR CNRS 5516 grouping academics from MINES Saint-Etienne, Télécom Saint-Etienne and Université Jean Monnet.

12 permanent staff
4 Postdoctoral Research Fellows
18 PhD students
2 Research Engineers

The team aims at contributing to the definition of models, algorithms and software architectures to support the inter-connection of physical, digital and social worlds in an open and decentralized context.

We develop scientific skills in Web of Data, Semantic Web, Multi-Agent Systems, Web of Things, Virtual Communities, Recommendation Systems, Trust and Privacy. The team CI develops contact with industrial partners like Renault, Orange, Engie, 1DLab …

INSPIRING
INNOVATION
SINCE 1816